Analysis of risk factors of postpartum depression

Shengfei Cao[1, †], Taowenxuan Yan[2, *, †], Jikai Yang[3, †]

[a]Xiwai International School, Shanghai, China;
[b]Vision Academy, Shanghai, China;
[c]Northeast Yucai Foreign Language School, Shenyang, China
[†]These authors contributed equally

[a]1621010253@stu.cpu.edu.cn

Abstract. With the continuous progress of science and technology, people's survival needs are growing, and the pressure is also growing. These pressures are also a huge threat to the mothers who have just given birth. Postpartum depression is a common non obstetric complication, which not only affects the physical and mental health of pregnant women, but also affects the relationship between mother and baby and the healthy growth of infants, and may even affect the whole family, such as marital disharmony. The occurrence of postpartum depression is the result of multiple factors. The neuroendocrine disorder caused by hormone changes is the pathological basis of the occurrence of postpartum depression. The postpartum depression is also mainly related to the psychological changes caused by pregnancy and childbirth. At the same time, social factors or social support are also risk factors of the disease. Early identification of high-risk factors, targeted management and intervention are carried out in each stage before, during and after childbirth, in order to better prevent and cure the disease.

Keywords: Postpartum depression, risk factors, identification

1. Introduction

Postpartum depression is a typical depression that happens after the pregnancy. The worldwide prevalence of postpartum depression is about 17.22%. Common symptoms of postpartum depression include both mental and physical problems. Patients with postpartum depression often show negative shifts in mood and attention, appetite problems, low sleep quality, and suicidal tendencies. Symptoms often appear a few weeks after giving birth, lasting for 3 to 6 months in general. However, it may continue for years. The influence of postpartum depression will not only consist of mothers; it may affect fathers and other family members as well. Moreover, postpartum depression may affect a baby's mental and physical health caused of a lack of maternal care for the child and less parent-child interaction. It is essential to detect and prevent postpartum depression [1]. Without treatment, postpartum depression may cause severe mental and physical damage to the mother or the whole family.

Treatment of postpartum depression comprises two parts: psychotherapy and medication. Both methods are reasonable precautions to decrease the prevalence of postpartum depression. Presently there is no specific medicine for postpartum depression which can cure this disorder completely. Medication has mainly been used for the improvement of depressive symptoms. With the advancement of time and technology, postpartum depression prophylaxis has become as significant as medical treatment.

Scientists believe that prevention is better than cure. Various risk factors lead to postpartum depression, for instance, physiological factors, psychosocial factors; maternal delivery factors; lifestyle; psychiatric history, and so on. The pathogenesis of postpartum depression is unclear. Through years of exploration, the relationship between the multi-system dysfunction of the organism and postpartum depression has been proved, but specific reasons haven't been determined due to complex pathways. Therefore, seeking and summing up risk factors that may induce postpartum depression is indispensable. This article reviewed some of the dangerous risk factors of postpartum depression and treatment for postpartum depression from recent years. A classical study for biological factors has included as well. Moreover, it gave out relevant prophylactic measures to provide a more theoretical basis for postpartum depression diagnosis in the future.

2. Biological factors

The weeks following the delivery of children among women are filled with depression, guilt, and agitation. Several studies discuss certain biological characteristics that contribute to postpartum depression, and several hormones, such as progesterone, estrogen, prolactin, cortisol, oxytocin, thyroid, and vasopressin [2].

2.1. Hormone level fluctuation

During the pregnancy, the amount of estrogen and progesterone increases because of the placental production but decreases after delivery when placenta is removed.

Estradiol and estriol from placenta increase by 100 times. Animal studies show that estradiol strengthens neurotransmitter function because of more synthesis and less breakdown of serotonin. The decline in estradiol after women give birth to their children results in depression among women.

Two studies show that estrogen supplementation reduces depression symptoms. The first study was a small open study that included four women with experience of postpartum depression. The women received up to 10 mg of Premarin (estrogen-replacement therapy) daily after delivery of children. None of these women experienced a recurrence of this disease, in spite of the expected risk of relapse of 35% to 60% 12 months later. In the second experiment, a double-blind placebo-controlled study of 61 women with major depression that developed within 3 months of delivery, 80% of the patients receiving an estrogen patch had Edinburgh Postnatal Depression Scale scores under the threshold for major depression after 3 months of treatment, compared with 31% of the placebo-treated group. Decrease in progesterone is indicated from the change in depression mood. However, this study lacked a control group.

2.2. Pituitary hormones

Prolactin increases from pregravid levels of 5–25 ng/ml to 140 ng/ml several months after delivery but decline 3 weeks later after giving birth of children in nonlactating women. Two posterior hormones, oxytocin and vasopressin have not been shown relation with each other. Prolactin can inhibit the response of gonad to gonadotropin, thereby inhibiting estrogen and progesterone, which are closely related to postpartum emotional changes respectively. Some studies have shown that prolactin may lead to postpartum depression by affecting the volume of gray matter in the brain [3].

2.3. Cortisol

Moderate cortisol is the normal response of the body to stress, while persistent and excessive cortisol release is the basis of many diseases. Cortisol levels increase greatly in late pregnancy because of the production in placenta of corticotropin releasing hormone and fall abruptly at delivery. One study that noted a positive relationship between morning serum cortisol levels at 6 weeks postpartum and degree of dysphoria in 26 women was confounded by a lack of control for stressful life events and for timing of breastfeeding, factors that may produce an elevation or a reduction, respectively, of cortisol levels.

However, some studies have reached inconsistent results. Prospective studies have found that there is no obvious correlation between the mood of postpartum pregnant women and the level of cortisol, but

the results also found that the level of adrenal cortisol may have a certain correlation with postpartum emotional abnormalities. Thus, it is assumed that the hypercortisolism that characterizes late pregnancy produces adrenal suppression following delivery that can result in depressive mood changes after women give birth to children when it is severe.

3. Psychosocial factors

Postpartum depression is a disorder that depends on serval variables. Many assessed psychosocial factors could be substantial Risk factors for postpartum depression. Past studies have validated serval efficacious psychosocial factors, such as social support, sleep disorders, and self-body dissatisfaction. This paper perceived that interoceptive sensibility has recently been confirmed as a risk factor for postpartum depression.

3.1. Sleep

Many negative aspects of sleep have been certificated as risk factors for postpartum depression. Sleep disorders are a common symptom of the postpartum disorder, and it has been recognized as a potent predictor for postpartum disorder [4]. Previous study illustrated poor sleep quality can continue for up to 3 years postpartum after pregnancy. [5] Recent studies investigate more factors relate to sleep conditions of pregnant women with postpartum depression more comprehensively [4,6]. Investigation of its mechanisms and magnitude in prevalence is still in progress.

In the descriptive study of Ying Liu et al., Women with sleep quality at a low or medium level tend to get postpartum depression [6]. Another study indicated that sleep quality is associated with depression and inflammatory cytokines. Sleep deprivation causes an immune imbalance between levels of pro-inflammatory and anti-inflammatory cytokines. Coincidently, candidate loci for manipulating the immune response of these cytokines relate to sleep quality as well. Furthermore, these genetic loci remarkably contribute to the occurrence of depression. Other study also expressed that women with blood type A have lowest sleep quality between ABO blood groups in the investigation, which implied women with blood type A are at higher risk for postpartum depression [4].

Sleep duration has also been considered in its relationship with postpartum depression. Pre-pregnancy sleep duration also predicts postpartum depression. A study in Japan indicated that when regarding sleep time as a continuous variable, the assessment of EPDS after change for covariates will decrease by 14% in the wake of a 1-hour increment of pre-pregnancy sleep duration. Low sleep duration before pregnancy contributes to higher EPDS scores for one month postpartum, especially in multipara women. Besides, multipara women with low sleep quality are more likely to get low scores of EPDS. It might also be noted that resemblance is found between post-partum sleep quality and pre-pregnancy sleep duration among multipara women, not in primipara women. The basic reason for short sleep duration is unclear. It can be a research consideration in the aftertime. Reasons for this tendency may be associated with low social support and social status, including social assistance and help from the husband. Treating sleep disorders and duration as significant risk factors is noteworthy. Flexible Treatment for low sleep quality may be an effective way to solve mental health problems. In addition, other factors that influence sleep (sleep latency; frequency of wakeup at nighttime) may become research direction according to future needs [6,7].

3.2. Body dissatisfactions

Body dissatisfaction defined as a person's esthesia of themselves and other people's view of them, which indicated body dissatisfaction as a predictor for postpartum depression. By contrast with early and later pregnancy stages, postpartum women are more likely to undergo body dissatisfaction. Body dissatisfaction will increase the risk of exitance of depression symptoms 2 or 6 months after delivery. Less Confidence to reinstate body image and weight during the third trimester of pregnancy relate to higher postpartum depression symptoms at 6 weeks [8].

Care of body image recovery and comparison with women not experiencing pregnancy may bring about this result. Body dissatisfaction is inclined to women's subjective feelings. Previous studies

illustrated that approximately 85% of women experienced body dissatisfaction during pregnancy [9]. High sensitivity to body and mood appeared during pregnancy. Researchers conjectured that women with body dissatisfaction would suffer more negative experience on physical and mental sections.

Body dissatisfaction is also associated with other psychosocial risk factors, such as social and family support, social status, dietary altitude, overweight caesarean section and non-breastfeeding. For instance, women who reported discontented body image are more likely to be on a diet and take more exercise. In the study of Riesco-González et al., people who continue anti-adiposity are 4.71 times higher to receive body dissatisfaction than others[10]. Women with low social support more dislike their body image. Body dissatisfaction also links with psychiatry history as a phenomenon. Women with a history of anxiety and depression also dissatisfied with their bodies. Riesco-González et al. suggested that it is necessary to help postpartum mother develop positive altitude for their self- image, providing implement for women to repair and meliorate their body image can be a good method [10].

3.3. Interoceptive sensibility

Interoceptive sensibility became a new significant predictor for postpartum depression in the past few years. Interoception is the basement of self-awareness. Interoceptive sensibility is a personal subjective measurement. In the general population, greater Interoceptive sensibility contributed to good body image. Especially, cognition of self-body reliability has a remarkable influence on body appreciation and body dissatisfaction [11-13].

One study (Claudio et al.) first demonstrated changes in Interoceptive levels of sensibility in early pregnancy foreshow postpartum depression symptoms. For the first time, interoceptive sensibility has emphasized its effect on postpartum depression. Compared to postpartum, in the early and last phase of pregnancy, women recognize the perception from the inside of their body more and understand the connection between these feelings and mood. They also reported they have better ability to manipulate and maintain the cognition of their body feeling. Pregnant women ignore less pain and malaise due to a more positive sense of their body signal. Compared to postpartum period, they expressed more worry about discomfort and mental disturbances after pregnancy. This implies that pregnant women have higher interoceptive sensibility during pregnancy. As a result, researchers found that less extent of interoceptive sensibility estimated in the early phase of pregnancy is forecasting elements for postpartum depression [14]. Due to a lack of resources, the association between interoceptive sensibility and other risk factors has not evaluated.

3.4. Social support

Social support refers to multiform assistance from the whole society, which the person receives, including instrumental and mental support. FJ Riesco-González et al. demonstrated that conspicuous statistical difference exists between social support and postpartum depression. lacking social support will significantly increase the prevalence of postpartum depression. In a Turkish study (Yaksi et al.), the graph Comparison of PSQ and spousal support scores and PPD showed that "unmet social support" scores are positively related to postpartum depression [10,15]. In the multivariate model from Ying Liu et al.'s research, in contrast with women with low social support, women with social support at medium or prominent levels decrease the risk of postpartum depression [6]. Study from South Korea observed that compared with women with high social support, women who lack social support getting postpartum depression are 4.63 times higher [16].

Besides, investigation relate to the relationship of social support with other psychosocial factors has appeared. In the study of South Korea, by generalizing the results of subgroup analyses on social support and PPD with covariates, researchers found women who sense themselves as having normal body image or obese with social support to medium or low extent are more likely to suffer from postpartum depression. Prevalence of postpartum depression among miscarriage women with low social support are 10.26 times higher than miscarriage women who accept high social support. Besides, researchers discovered the highest possibility of attaining postpartum depression in women with both jobs and low levels of social support. Current study indicated women with job getting postpartum depression are 2.8

times higher. Pressure from work usually cannot alleviate. Social support applied from workplace can buffer role ambiguity and overstrain. Since pregnant women need prevention for postpartum depression and improvement in physical and mental health condition, providing substantial social and family support from intimate friends, family members and society; assistance from professional medial stuff is essential [16].

3.5. Psychiatric history

Apart from physiological and psychosocial factors, psychiatric history has also been considered as a risk factor for postpartum depression. Psychiatric history included two aspects: family history of psychiatric disorders (family history of psychopathology); personal psychiatric history (previous psychopathology). Family history of psychiatric disorders is a powerful predictor for postpartum depression. With the previous psychopathology or have a family history of psychiatric disorders are more likely to become postpartum depression, risk nearly tripled [17]. A systematic review and meta-analysis by Kjeldsen et al. recognized that postpartum depression among mothers with a family psychiatric history is twice the prevalence among normal mothers. Kjeldsen et al. also emphasized that personal psychiatric history was a significant predictor for postpartum depression [18]. However, no conspicuous association between a family history of psychiatric disorders and postpartum depression has been found in the Turkish study [15]. In-depth verification of the accuracy of the conclusions and discovery of the truth is needed in the future. Previously, researchers found that using personal and family history of psychiatric factors can quickly assess the risk of postpartum depression at a low cost. This method may leave time for preventing postpartum depression since the estimation can run before pregnancy. The next step is formulating a detailed plan and considering how to combine it with present screening methods [18].

4. Parturition factors

4.1. Mode of delivery

The mode of delivery, especially vaginal midwifery, may be related to the maternal concern about the adverse impact of midwifery on the newborn and the physical consumption and mental stimulation of dystocia on the maternal. If this mental state persists and cannot be effectively relieved, it is likely to lead to postpartum depression. For cesarean section parturient, the physiological stress and physiological changes are obvious, which makes it difficult for them to maintain a good psychological state and will increase the incidence of this disease. Meta analysis showed that compared with vaginal delivery, cesarean delivery women had a higher risk of depression, about 33% higher [19]. In some studies, the incidence of postpartum depression was compared between the parturient who had undergone the first cesarean section and those who had undergone multiple cesarean sections. There was no statistical difference. However, there is a limitation in this study. The investigation deadline is 42d postpartum, and there is no statistics on possible late postpartum depression [20].

4.2. Childbirth

Whether the newborn can deliver smoothly and whether the body is healthy is one of the key factors affecting postpartum depression. In case of premature delivery, substandard body mass and congenital diseases, the parturient may feel guilty, have anxiety, depression, and other negative emotions, and increase the risk of the disease.

The sex of newborn is not the direct cause of postpartum depression. However, the feudal ideology of inheriting the family line and preferring sons to daughters still exists in many areas of China, especially in rural areas, or the gender and expectations of the second child are inconsistent, which may have an impact on the spirit of the lying in women [21].

4.3. Unintended pregnancy

Unplanned pregnancy hinders women's more active behavior during pregnancy. They start prenatal care later than women in planned pregnancy and may not be able to insist on completing prenatal care

eventually. At the same time, accidental pregnancy often makes women unprepared, which makes the emotional fluctuation more obvious, and the psychological endurance is low, which is also one of the risk factors of postpartum depression. Meta analysis showed that women with unexpected pregnancy had a higher risk of postpartum depression than women with normal pregnancy preparation, about 1,53 times [22].

5. Conclusion

Postpartum depression is the result of the interaction of physiology, psychology, obstetrics, society, and other aspects. It should be highly valued by individuals, families, society, and medical personnel, especially spouses, caregivers, and nursing staff. With the continuous change of clinical medical model, medical workers are also paying more and more attention to the psychological state of the lying in the women. By analyzing a variety of risk factors that may cause postpartum depression, scholars can find maternal psychological abnormalities as soon as possible, and give timely targeted nursing interventions to prevent and reduce the occurrence of postpartum depression. In addition, the clinician should also strengthen the monitoring during pregnancy, prenatal counseling, and eugenics education, carry out prenatal inspection, early detection, and early treatment, and achieve eugenics.

In the future, people can strengthen the screening and intervention of the population vulnerable to postpartum depression during pregnancy, so as to play a positive role in improving women's health and promoting children's mental health.

Reference

[1] Wang, Ziyi, et al., *Translational psychiatry* (Nature Publishing Group, United Kingdom, 2021), pp. 1-13.
[2] Hendrick, Victoria, Lori L. Altshuler, and Rita Suri., *Psychosomatics* (American Psychiatric Publishing Inc., United States, 1998), pp. 93-101.
[3] Cheng, Bochao, et al., *Journal of Affective Disorders* (Elsevier, Netherlands, 2022), pp. 253-259.
[4] Shi, Xiang, et al., *Journal of Psychosomatic Research* (Elsevier Inc., United States, 2021), pp. 1-5.
[5] Wang, Guanghai, et al., *Sleep* (Oxford University Press, Britain, 2018), pp. 1-10.
[6] Liu, Ying, et al., *BMC Psychiatry* (BioMed Central, England, 2021), pp. 1-11.
[7] Matsuo, Seiko, et al., *Archives of Women's Mental Health* (Springer-Verlag Wien, Austria, 2022), pp. 181-189.
[8] Chan, Chui Yi, et al., *Journal of Affective Disorders* (Elsevier, Netherlands, 2020), pp. 582-592.
[9] Hicks, S., and A. Brown., *Midwifery* (Churchill Livingstone, United States, 2016), pp. 132-140.
[10] Riesco-González, Francisco Javier, et al., *Medicina* (Multidisciplinary Digital Publishing Institute (MDPI), Switzerland, 2022), pp. 1-14.
[11] Todd, Jennifer, et al., *Body image* (Elsevier BV, Netherlands, 2019), pp. 171-180.
[12] Todd, Jennifer, et al., *Body Image* (Elsevier BV, Netherlands, 2019), pp. 6-16.
[13] Todd, Jennifer, et al., *International Perspectives in Psychology: Research, Practice, Consultation* (Hogrefe-Verlag GmbH and Co. KG, Germany, 2022), pp. 53.
[14] Solorzano, Claudio Singh, et al., *Journal of Affective Disorders* (Elsevier, Netherlands, 2022), pp. 239-246.
[15] Yaksi, Nese, and S. A. V. E. Dilsad., *Marmara Medical Journal* (Marmara University, Turkey, 2021), pp. 327-338.
[16] Cho, Hahyeon, et al., *Scientific reports* (Nature Publishing Group, United Kingdom, 2022), pp. 1-9.
[17] Ferrari, Barbara, et al., *Journal of reproductive and infant psychology* (Routledge, United Kingdom, 2021), pp. 486-498.
[18] Kjeldsen, Mette-Marie Zacher, et al., *JAMA psychiatry* (American Medical Association, United States, 2022), pp. 1004-1013.

[19]   Sun, Lei, Su Wang, and Xi-Qian Li, *Australian & New Zealand Journal of Psychiatry* (SAGE Publications Ltd, United Kingdom, 2021), pp. 588-601.

[20]   Dong Sulin, Liu Yan, Sun Xingfeng, Huang Shaoqiang. Investigation on puerperal depression of cesarean section women [J]. *Laboratory Medicine and Clinical Medicine*, 2021,18 (21): 3179-3181.

[21]   Hua J, Zhu L, Du W, Du L, Luo T, Wu Z., *BMJ open* (BMJ Publishing Group, United Kingdom, 2016), pp. 1-9.

[22]   Qiu, Xing, et al., *Journal of Psychosomatic Research* (Elsevier Inc., United States, 2020), pp. 1-10.